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MEMORANDUM FOR: (See Distribution List)

FROM:

[redacted]
Chief, Strategic Resources Division
Office of Global Issues

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SUBJECT:

Cambodia's 1985/86 Rice Crop [redacted]

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1. The attached memorandum provides our estimate of Cambodia's 1985/86 rainy and dry season rice production and assesses the outlook for the 1986/87 rice crop. The paper is based on a comprehensive imagery survey, meteorological data, [redacted]

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2. This assessment was produced by [redacted]
[redacted] Agricultural Assessments Branch, Strategic Resources
Division, Office of Global Issues. [redacted]

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3. Comments and questions are welcome and may be addressed to the Chief, Agricultural Assessments Branch, [redacted]

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Attachment:

Cambodia: Rice Recovery
GI M 86-20193, August 1986

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SUBJECT: Cambodia's 1985/86 Rice Crop

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OGI/SRD/AAB, (15 September 1986)

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[REDACTED]

Central Intelligence Agency



Washington, D.C. 20505

DIRECTORATE OF INTELLIGENCE

15 SEP 1986

Cambodia: Rice Recovery

Summary

Based on a comprehensive analysis of imagery, meteorological data, [REDACTED] we estimate that Cambodia's 1985/86 rice harvest (rainy and dry season) reached nearly 1.8 million metric tons, 20 percent above the flood-damaged crop of 1984/85. Our analysis corroborates the Cambodian regime's commentary during the 1985/86 crop season that rice output was satisfactory and that famine was no longer a threat. Nevertheless, Cambodia's Agriculture Minister recently claimed that below plan rice production in 1985/86 would result in food shortages unless aid was received promptly. [REDACTED]

The outlook for the 1986/87 rice crop is uncertain at this early point in the season; however, the early onset of steady monsoon rainfall in May and the regime's emphasis on expanding rice hectareage are positive signs for the 1986/87 crop. [REDACTED]

We believe the Cambodian rice area will steadily increase over the next several years as abandoned farmland is reclaimed and irrigation networks are repaired and expanded. [REDACTED]

This memorandum was prepared by [REDACTED]
[REDACTED] Agricultural Assessments Branch, Strategic Resources
Division, Office of Global Issues. Comments may be directed to
[REDACTED] Chief, Strategic Resources Division, [REDACTED]

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[REDACTED]

Cambodia: Rice Recovery

Introduction

We estimate that Cambodia's 1985/86 rice production (rainy and dry season) reached nearly 1.8 million metric tons, up from our estimated 1984/85 level of almost 1.5 million tons. (Table 1). This assessment is based mainly on evidence from [REDACTED]

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[REDACTED] Landsat imagery which revealed generally healthy rainy season rice throughout Cambodia and showed that, unlike the previous year, no regions suffered major flood damage. With the 1985/86 harvest complete, planting of the 1986/87 rice crop is off to a good start, aided by the early onset of monsoon rainfall in May. [REDACTED]

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Overall rice yields in Cambodia vary little from year-to-year; the major factor affecting annual production is the total area planted. The pace of rice sowing and the hectareage achieved depend on the timing of monsoon rainfall and the extent of flooding. Sowing and harvesting operations extend through most of the year because many rice varieties with differing growing seasons are used. Rainy season rice, yielding an average of 1.1 tons per hectare, accounts for 90 percent of Cambodia's annual production and is planted from June through November; the bulk of harvesting is done from December through February. Dry season rice is planted from November through March and harvested from February through April. More sunlight, controlled watering, and less disease allow dry season rice to yield an average of 1.7 tons per hectare. We expect Cambodia's rice area and yields to increase as irrigation systems are rebuilt and land reclamation progresses. [REDACTED]

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In past years the Cambodian regime has claimed that rice shortfalls would result in serious food shortages unless substantial aid was received. Assessment of the adequacy of the country's annual rice crop is complicated, however, by the lack of an exact population figure for Cambodia² and by disagreement

¹ Cambodia's rice yields have traditionally been poor in relation to other countries. A labor force with low technical skills, shortages of draft animals, fertilizer, seeds and equipment, and a deteriorated irrigation network contribute to low yields. [REDACTED]

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² A recent press report said that Phnom Penh puts the population at 7.5 million, but relief agencies estimate 7.0 million. [REDACTED]

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[redacted]

on the size of an adequate rice ration.³ Rice rations can be supplemented by other food crops (corn, cassava, sweet potatoes, vegetables, bananas, coconuts), as well as fish and game. On the other hand, a good harvest in Cambodia would not preclude local food shortages in light of the country's transport and distribution problems, and government difficulties in procuring rice from farmers. [redacted]

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1985/86 Rice Crop

Cambodian commentary on the rice situation took an upbeat turn during the 1985/86 crop season. In contrast to the severe drought and flood losses claimed during the 1984/85 season,⁴ regime comments suggested that rice output was satisfactory and that famine was no longer a threat. Reports did cite occurrences of drought and flood, but rice losses were not emphasized. The most serious claim of adverse weather was a long drought last summer--in August 1985 Cambodian officials told Western journalists that losses from the "severe" drought could reach 1 million tons of rice. Analysis of provincial agricultural progress reports, however, showed that rice hectarage destroyed was insignificant. [redacted]

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More recently, the regime again complained of a rice shortfall--in late July the Agriculture Minister said that the 1985/86 rice harvest had reached only 80 percent of plan due to dry weather and slow subsiding of the Mekong floods. This comment implied a crop of 1.84 million tons, slightly above our estimate. The minister said that Cambodia needed aid to relieve food shortages. [redacted]

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Our analysis of imagery, meteorological data, and collateral reporting corroborates earlier Cambodian comments that the 1985/86 rice crop was a relatively good one. We estimate that

³ The FAO minimum emergency ration is 12 kilograms of rice per month for an individual to sustain life; 18 kilograms would support physical labor. Phnom Penh has stated requirements of 14 or 15 kilograms per month. [redacted]

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⁴ During the 1984/85 crop season, the Cambodian regime presented a FAO consultant with data showing destruction of 463,400 hectares of rice, leaving a rainy season rice area of only 836,400 hectares to be harvested. Numerous contradictory reports of adverse weather and crop damage during the growing season were featured in Cambodian radio broadcasts and in international press articles. Our analysis of imagery and meteorological data, however, indicated that the downturn was substantially smaller than claimed by the regime. Subsequent broadcasts from the Soviet Union, Vietnam, and Cambodia claimed that a successful 1984/85 rice output of 2.0 million tons was harvested. [redacted]

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[redacted]

total rice output reached almost 1.8 million tons, 20 percent above the flood-damaged crop of 1984/85. Provincial sowing figures showed that hectarage of the major, rainy season crop was up almost 13 percent. Imagery of main rice zones indicated that no unusual flood damage to the rainy season crop had occurred, and rice fields appeared slightly healthier than in the previous year. [redacted]

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Weather Improved. Analysis of US Air Force weather data indicated a normal 1985 monsoon. Rainfall totals from weather stations inside Cambodia are not available, so data from bordering stations in Thailand and Vietnam are used. Moreover, rainfall within Cambodia does not indicate the total amount of water available for the rice crop. Instead, rainfall in the mountainous areas outside Cambodia provides the bulk of the water--in the seasonal floods of the Tonle Sap, the Mekong, and other rivers. Analysis of weather station data shows no prolonged periods without rain last summer when Cambodian officials claimed that a drought occurred. Moreover, all the weather stations along the Mekong in Thailand reported 100 percent or more of mean rainfall. Rainfall was not judged to be excessive enough to cause major flooding as in 1984. [redacted]

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Ambitious Plan. The four goals of the 1985/86 agricultural plan--sufficient food for the people, a stockpile of food and seeds, farm exports, and raw materials for industry--suggest that the regime expected farm output to go beyond meeting minimum food needs. Although the plan did not call for an increase in total rice area, which again was to be 1.85 million hectares, higher yields were to push production to 2.3 million tons. The plan also called for 40,000 tons of rice to be produced for export. A program for intensive rice cultivation, featuring extra attention to fertilizers, weeding, and irrigation, reportedly covered over 200,000 hectares, an increase of over 50,000 hectares from the previous year. Broadcasts disclosed efforts to train and organize farmers, provide additional inputs, and to take measures against insects and rats. [redacted]

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1985/86 Rainy Season Rice

Although Phnom Penh has not announced the exact size of the 1985/86 rainy season rice harvest, we estimate that output reached over 1.5 million tons, 24 percent above the estimated 1.25 million tons gathered in 1984/85. (Table 2). The plan had called for production of 1.97 million tons. [redacted]

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Hectarage Up. We estimate that the rainy rice area reached 1.44 million hectares, a 13 percent increase from the 1.28 million hectares of 1984/85. Our estimate is based on provincial sowing reports from Cambodian broadcasts. Although only one of the twelve major rice growing provinces achieved its sowing plan, eleven provinces increased their rice areas from those of

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1984/85. A [] survey⁵ of 10 of the 12 major rice producing provinces showed that, on average, about 85 percent of the rice paddies were active compared to about 70 percent in 1984/85. []

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Improved Yields. Analysis of [] Landsat imagery indicated that the rice crop was in better condition than in 1984/85. The following table compares [] imagery survey results for the past three years:

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Imagery Survey Rice Conditions

(Average of Provinces Covered)		<u>Percent of Rice Fields</u>		
<u>Year</u>		<u>Good</u>	<u>Fair</u>	<u>Poor</u>
1983/84		45	28	27
1984/85		20	57	23
1985/86		26	51	23

Although the rice fields sampled showed only a slightly improved condition from the previous year, Landsat coverage of Cambodia's main rice region from October through December 1985 showed generally healthy rice with no major pockets of destruction from flooding, as occurred in 1984/85. []

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Harvest and Procurement. As in previous years, Phnom Penh has disclosed only fragmentary data on areas harvested and yields obtained. Several broadcasts early in 1986 characterized results as better than other years, and a UN official who visited Cambodia last February commented that the harvest appeared to be good. On the other hand, regime exhortations to boost rice procurement implied that sales to the state could be improved.

⁵ Our estimate of the 1985/86 Cambodian rainy season rice crop is based on a statistically valid sample survey []

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[] in early December 1985. The survey covered 9 of 10 selected areas, which include 10 provinces from within the country's main rice producing regions. The survey involved placing computer-generated overlays, each having 100 random points, on cloud-free film and assigning the land at each random point to one of the following land use categories:

- o Fallow or abandoned fields.
- o Flooded or flood destroyed fields.
- o Other (harvested ricefields, plowed fields, and field crops other than rice).
- o Active rice paddies, then categorized as in good, fair, or poor condition.
- o Non-agricultural land.

The total number of fields in each agricultural category was used to derive the percentages shown in Table 2. []

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[REDACTED]

The purchasing campaign was reportedly going slowly, and by late April 133,500 tons of rainy rice had been bought by the state, compared to 240,000 tons from the good harvest of 1982. Phnom Penh also commented that state buyers should deal directly with farmers to cut out private merchants and that the flow of goods to sell or barter to farmers must be increased. [REDACTED]

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1985/86 Dry Season Rice

We estimate that 1985/86 dry season rice production reached 228,000 tons, slightly below that of the previous year due to a smaller area. An April 1986 broadcast said that about 114,000 hectares or 76 percent of the plan had been sown, and we estimate that yields matched the 2.0-ton-per-hectare level of 1984/85. Little information was revealed on the dry season crop, which had been planned to reach 330,000 tons from 150,000 hectares. [REDACTED]

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Outlook for the 1986/87 Crop

Prospects for the 1986/87 rice crop are uncertain at this early point in the planting campaign, but several positive signs are evident. Weather data show that monsoon rainfall began in May, earlier than usual, and has been steady. Last fall the regime proclaimed that food was the major "spearhead" in the new five year plan. Amid many exhortations to perform the necessary agricultural tasks, the goal of eventually expanding rice hectarage to the pre-war area of 2.5 to 3.0 million hectares was emphasized. One broadcast expressed confidence that the experiences of 1985 would guarantee success with the 1986 crop. [REDACTED]

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In our view, Cambodian rice output is likely to increase over the next few years, barring natural disasters. Although lack of inputs will cause yields to rise slowly at best, the rice area should steadily increase as irrigation networks are repaired and expanded, and as abandoned farmland is reclaimed. Progress will depend, however, on the ability of the regime to provide inputs, training and incentives to farmers, and to offer favorable terms in buying rice from them. Moreover, the ongoing insurgency will tend to disrupt such regime efforts. [REDACTED]

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Table 1

Cambodia: Rice Crops ^a						
	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86
<u>Rainy Season Rice</u>						
Planned area (thousand hectares)	1,500	1,700	1,600	1,600	1,700	1,700
Harvested area (thousand hectares)	1,232	1,300	1,545	1,358	1,276	1,440
(% of plan)	82%	76%	97%	85%	75%	85%
Yield (metric tons/hectare)	1.19	1.0	1.16	1.08	.98 ^d	1.07
Production (thousand metric tons)	1,466	1,300	1,788	1,467	1,250 ^d	1,547
<u>Dry Season Rice</u>						
Planned area (thousand hectares)	123	150	165	155	150	150
Harvested area (thousand hectares)	88	149	135	105	119	114
(% of plan)	72%	99.6%	82%	68%	79%	76%
Yield (metric tons/hectare)	1.30	1.7	1.6	1.79	2.0	2.0
Production (thousand metric tons)	115	256	216	208 ^b	238	228
<u>Total Rice</u>						
Planned area (thousand hectares)	1,623	1,850	1,765	1,755	1,850	1,850
Harvested area (thousand hectares)	1,320	1,449	1,680	1,463	1,395	1,554
(% of plan)	81%	78%	95%	83%	75%	84%
Yield (metric tons/hectare)	1.20	1.07	1.19	1.14	1.07	1.15
Production (thousand metric tons)	1,581	1,556	2,004	1,675 ^c	1,488 ^d	1,785

^a Area, yields, and production for 1980/81 are FAO estimates, and the same data for 1985/86 are CIA estimates. All other data are from Cambodian announcements except where noted. Numbers have been rounded.

^b Using the area and yield shown, dry season production would be 188,000 tons instead of the 208,000 tons reported.

^c million tons from an area of 1.7 or 1.8 million hectares. but 1983/84 production at 2.0

^d CIA estimate. Rainy season rice output for 1984/85 has not been announced, put 1984/85 total rice output at 2.0 million tons.

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Table 2

Cambodia: 1985/86 Rainy Season Rice

Province	1984/85 Rice Area ^a (ha)	1985/86 Rice Area ^a (ha)	CIA Est. Yield ^b (mt/ha)	CIA Est. Production (mt)	Reported Weather Conditions ^c	Imagery Sampled Data ^d			Poor Rice (%)
						Active Rice Paddies (%)	Good Rice (%)	Fair Rice (%)	
Batdambang	180,400	187,000	1.2	224,400	drought, floods	98	37	49	14
Prey Veng	187,200	207,200	1.2	248,600	drought, floods	91	36	53	11
Siemreab-Otdar									
Meanchey	136,000	150,700	.9	135,600	good start, damaging	79	19	40	41
Kampong Cham	124,100	121,900	1.3	158,500	drought, natural disasters	67	45	43	12
Takev	114,200	166,000	1.0	166,000	--	85	15	60	25
Svay Rieng	82,200	110,000	.9	99,000	drought	--	--	--	--
Kampong Thum	95,000	103,500	1.0	103,500	drought	92	17	61	22
Kampot	95,900	99,100	1.1	109,000	drought, floods	83	27	63	10
Kampong Spoe	57,500	64,600	1.0	64,600	drought	--	--	--	--
Pouthisat	51,000	65,900	1.1	72,500	damaging	88	33	42	25
		(est.)							
Kandal	44,000	47,000	.9	42,300	drought	69	13	47	40
Kampong Chhnang	35,300	41,000	1.0	41,000	damaging	87	19	55	26
Other ^e	72,800	75,600	1.1	81,700	--	--	--	--	--
		(est.)							
Total	1,275,600	1,439,500	1.07	1,546,700					

^a Areas are from Cambodian broadcasts. Areas were estimated for provinces which did not report sowing progress. Numbers have been rounded.

^b Estimated yield was based on [] samples of nine selected areas, Landsat imagery, and collateral reports. []

^c According to Cambodian broadcasts. []

^d The first column gives the percentage of active rice paddies to the total number of fields sampled. Fields were classified as rice, fallow-abandoned, flooded or flood destroyed, harvested, plowed, or a non-rice crop. []

^e Includes Kracheh, Preah Vihear, Rotanakiri, Stoenq Trenq, Kaoh Kong, Mondol Kiri, and Kampong Saom and Phnom Penh municipalities. []